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# OREGON AGRICULTURAL COLLEGE

## EXTENSION SERVICE

RALPH D. HETZEL, Director.

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Information Designed to Aid Operators, of the

### Babcock Test and Users of Babcock Glassware,

To Meet the Requirements of Recent Legislation

By

EDWARD B. FITTS



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The bulletins of the Oregon Agricultural College are sent free to all  
residents of Oregon who request them.

## OREGON AGRICULTURAL COLLEGE

W. J. Kerr, President.

### **EXTENSION SERVICE.**

R. D. Hetzel, Director.

The Extension Service of the Oregon Agricultural College embraces all instructional work done by the College staff outside the institution. This includes institute, lecture, and fair work in all its varied phases; supervision of the county demonstration and farm work provided for by state legislation; correspondence courses; preparation of educative exhibits; publication of bulletins and distribution of news matter; cooperative work with granges, farmers' unions, schools, churches, commercial clubs, and other progressive organizations in the promotion of industrial and social enterprises. The Extension Service, in short, consists of carrying out to the people of Oregon practical and usable information on all subjects taught at the College.

Applications for assistance along any of the lines indicated, together with all particulars relating thereto, should be sent to the Director of Extension as far in advance as possible. It is the desire of the College to help all who apply, but its staff, facilities, and funds are limited; consequently, short-notice requests may not find the department in position to render the best service.

Particular attention is called to the fact that counties desiring to organize for agricultural field and demonstration work, under the provisions of Chapter 110, Laws of 1913, must make an initial appropriation in order to secure the State aid. Those interested in promoting this work should communicate with the Director of Extension, or the State Leader, at the Agricultural College, with reference to the best methods of procedure.

### DEPARTMENT OF DAIRY HUSBANDRY

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Cooperative Extension work with U. S. Dairy Division.

Information Designed to Aid Operators, of the  
BABCOCK TEST AND USERS OF BABCOCK GLASSWARE,  
To Meet the Requirements of Recent Legislation.

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**Need for Bulletin**

At the recent legislative assembly a law was enacted requiring that all buyers of milk, cream, and butter fat for the purpose of manufacture, and all operators of the Babcock test for determining butter fat, secure a license. The law also requires that only standard glassware be used in the testing of milk and cream for butter fat content.

The purpose of this bulletin is to acquaint the dairy products manufacturing interests of the State with the provisions of the law and to give information that will aid testers and others in conforming to its requirements.

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**AN ACT**

(H. B. 207)

To prevent unlawful discrimination in receiving and purchasing milk and cream and butter fat and to provide for the uniform manner of sampling, weighing, and testing milk, cream, and butter fat, and providing for the use of standard glassware for testing and weighing milk, cream and butter fat, and providing for licensing creameries and testers and providing for punishment for violations of the same.

**BE IT ENACTED BY THE PEOPLE OF THE STATE OF OREGON:**  
**Discrimination in the Purchase of Milk, Cream or Butter Fat Unlawful**

Section 1. Any person, firm or corporation engaged in the business of buying milk, cream, or butter fat for the purpose of manufacture, either by himself or another, who shall, with the intention of creating a monopoly, destroying the business of a competitor or restraining in any manner an open competition in said business, discriminate between the different sections, localities, communities or cities of this State by purchasing or offering to purchase such commodity at a higher price in any one locality than is paid or offered for the same commodity by such person, firm or corporation in any other locality after making due allowance for the difference, if any, in the grade or quality, and in the actual cost of transportation from the place of purchase to the place of manufacture, sale or storage, shall be deemed guilty of a misdemeanor and punished as hereinafter provided.

**Weighing, Measuring and Sampling Milk and Cream**

Section 2. It shall be unlawful for any hauler of milk, or cream, or any person, firm or corporation receiving or purchasing milk or cream by weight or test or both, or by measure or test or both, to fraudulently manipulate the weight, measure, or test of milk or cream of any person or to take unfair samples thereof, or to fraudulently manipulate such samples.

The hauler or other agent shall weigh or measure the milk or cream of each patron accurately and correctly and shall report such weights or measurements accurately and correctly to the creamery or factory. He shall thoroughly mix the milk or cream of each patron by pouring or stirring until such milk or cream is uniform and homogeneous in richness, before the sample is taken from such milk or cream. When the weighing or sampling is done at the creamery, shipping station or factory, the same rule shall apply.

### Glassware for Testing Milk and Cream

Section 3. Every person, firm or corporation receiving or purchasing milk or cream on the basis of the amount of butter fat contained therein as determined by the Babcock test, shall use the standard Babcock test bottles, pipettes and accurate weights and scales as defined in Sections 12 and 13 of this Act, and all Babcock test bottles and pipettes shall have been inspected for accuracy by the Oregon Agricultural College or its agent and shall be legibly and indelibly marked by the Oregon Agricultural College or its agent with the letters S. G. O. (Standard Glassware Oregon.)

It shall be unlawful for any firm or corporation or any of their agents to use any other than standard test bottles and pipettes which have been examined and marked as provided by this section, to determine the amount of fat in milk or cream received or purchased on the butter fat basis.

### Accurate Testing Required

Section 4. It shall be unlawful for any person, firm or corporation, by himself or as the agent, servant, employee or officer of any person, firm or corporation receiving or purchasing milk or cream on the basis of the amount of butter fat contained therein, to under-read, over-read or otherwise fraudulently manipulate the Babcock test used for determining the per cent of butter fat in milk or cream, or to falsify the records thereof or to read the test at any other temperature than the correct one which is 130 degrees to 140 degrees Fahrenheit, or to pay on the basis of any measurement or weight except the true measurement of weight which is seventeen and six-tenths (17.6) cubic centimeters for milk and nine (9) grams or eighteen (18) grams for cream: PROVIDED, that in all tests for cream the cream shall be weighed into the test bottle.

### Licensed Testers Required

Section 5. All testing of milk or cream purchased on the basis of the amount of butter fat contained therein, shall be done by a licensed tester who shall supervise and be responsible for the operation of the Babcock test of milk or cream. The license shall be issued to such person by the Dairy and Food Commissioner upon the presentation by the applicant of a certificate of proficiency properly filled out and signed by the Chief of the Dairy Department of the Oregon Agricultural College and upon payment of a license fee as provided for in Section 8 of this Act.

The license shall be valid for the term of one year unless sooner revoked and shall be revoked by the Dairy and Food Commissioner if, after due notice the licensee has failed to comply with the laws, rules and regulations under which the license was granted; PROVIDED, that the provisions of this section shall not apply to individuals, hotels, restaurants or boarding houses buying milk or cream for private use.

### Examination Board

Section 6. The Chief of the Dairy Department of the Oregon Agricultural College and his assistants are created a board whose duty it shall be to examine into the qualifications of all applicants for such license, and every such applicant shall satisfy said board of his qualifications before any license shall be issued to him.

### License for Handlers of Milk and Cream

Section 7. Every creamery, shipping station, milk factory, cheese factory, ice cream factory, condensery, or any person, firm or corporation receiving or purchasing milk or cream on the basis of butter fat contained therein, shall be required to hold a license so to do. The license shall be issued to such creamery, shipping station, milk factory, condensery, ice cream factory, cheese factory, or person, firm or corporation by the Dairy and Food Commissioner upon complying with all sanitary laws, rules and regulations of the State of Oregon and upon complying with the provisions of Section 2 to 5 inclusive of this Act and upon payment of a license fee as provided for in Section 8 of this Act. This license shall be valid for the term of one year unless sooner revoked, and shall be revoked by the Dairy and Food Commissioner if, after due notice the licensee fails to comply with the laws, rules and regulations under which it was granted; PROVIDED, that the provisions of this section shall not apply to individuals, hotels, restaurants, and boarding houses buying milk or cream for private use.

### Fees for Licenses and the Testing of Glassware

Section 8. The testers' license shall be issued upon compliance with the provisions under Sections 5 and 6 of this Act and upon payment by the applicant to the Dairy and Food Commissioner of the sum of \$1.00. The creamery license shall be issued upon compliance with the provisions under Section 7 of this Act, and upon payment by the applicant to the Dairy and Food Commissioner of \$1.00. For all testing of glassware by the said Oregon Agricultural College or its agent, a fee of 3 cents shall be paid by the owner of said glassware to the Oregon Agricultural College for every piece of glassware so examined, and said fee shall be used by the Oregon Agricultural College to defray the cost of testing such glassware.

### Accounting for Funds Received for Licenses

Section 9. The money for license fees as provided for in Section 8 of this Act shall be paid to the Dairy and Food Commissioners by whom it shall be transmitted to the State Treasurer to be deposited in the General Fund.

### Prosecuting Attorney. Duties.

Section 10. It shall be the duty of every prosecuting attorney to whom the Dairy and Food Commissioner shall report any violations of the provisions of this Act to cause proceedings to be commenced against the person or persons so violating the provisions of this Act, and to prosecute the same to final termination according to the laws of the State of Oregon.

### Penalties

Section 11. Any employee of a firm, company, association, corporation or persons receiving or purchasing milk or cream on the basis

of the amount of butter fat contained therein, violating any of the provisions of his Act, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in the sum of not more than two hundred fifty (\$250.00) dollars or be imprisoned in the county jail for not more than twelve months, or both.

Any person, firm or corporation purchasing milk or cream on the basis of the amount of butter fat contained therein, violating any of the provisions of this Act, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not more than \$1,000.00 or imprisoned in the county jail for a period of not more than one year, or both such fine and imprisonment.

### Standard Babcock Testing Glassware Defined

Section 12. The term "Standard Babcock Testing Glassware" shall apply to glassware and weights complying to the following specifications:

#### (a) Standard Milk Test Bottles

Graduation for milk test bottles.—The total per cent graduation shall be 8. The graduated portion of the neck shall have a length of no less than 63.5 millimeters ( $2\frac{1}{2}$  inches), the graduations shall represent whole per cent, five-tenths per cent, and tenths per cent. The tenths per cent graduations shall not be less than three millimeters in length; the five-tenths per cent graduations shall be one millimeter longer than the tenths per cent, graduations projecting one millimeter to the left; the whole per cent graduations shall extend at least one-half way around the neck to the right and projecting two millimeters to the left of the tenths per cent graduations. Each per cent graduation shall be numbered, the number being placed on the left of the scale. The error at any point of the scale shall not exceed one-tenth per cent.

Neck.—The neck shall be cylindrical and the cylindrical shape shall extend for at least 9 millimeters below the lowest and above the highest graduation mark. The top of the neck shall be flared to a diameter of not less than ten millimeters.

Bulb.—The capacity of the bulb up to the junction of the neck shall not be less than 45 c. c. (cubic centimeters). The shape of the bulb may be either cylindrical or conical with the smallest diameter at the bottom. If cylindrical, the outside diameter shall be between 34 and 36 millimeters; if conical, the outside diameter of the base shall be between 31 and 33 millimeters, and the maximum diameter between 35 and 37 millimeters. The charge of the bottle shall be 18 grams. The total height of the bottle shall be between 150 and 165 millimeters ( $5\frac{7}{8}$  and  $6\frac{1}{2}$  inches).

#### (b) Standard Cream Test Bottles

Three types of bottles shall be accepted as standard cream test bottles, a fifty per cent nine-gram short-neck bottle, a fifty per cent nine-gram long-neck bottle, and a fifty per cent 18-gram long-neck bottle.

Fifty per cent nine-gram short-neck bottle.—Graduation.—The total per cent graduation shall be 50. The graduated portion of the neck shall have a length of not less than 63.5 millimeters ( $2\frac{1}{2}$  inches). The graduation shall represent five per cent, one per cent and five-tenths per cent. The five per cent graduations shall extend at least half-way around the neck to the right.

The 5-10 per cent graduations shall be at least 3 millimeters in length, and the 1 per cent graduations shall have a length intermediate between the 5 per cent and the 5-10 per cent graduations. Each 5 per cent graduation shall be numbered, the number being placed on the left

of the scale. The error at any point of the scale shall not exceed 5-10 per cent.

**Neck.**—The neck shall be cylindrical and the cylindrical shape shall extend at least nine millimeters below the lowest and nine millimeters above the highest graduation mark. The top of the neck shall be flared to a diameter of not less than ten millimeters.

**Bulb.**—The capacity of the bulb up to the junction of the neck shall not be less than 45 c. c. The shape of the bulb may be either cylindrical, or conical with the smallest diameter at the bottom. If cylindrical, the outside diameter shall be between 34 and 36 millimeters. If conical, the outside diameter of the base shall be between 31 and 33 millimeters and the maximum diameter between 35 and 37 millimeters.

The charge of the bottle shall be nine grams.

All bottles shall bear on the top of the neck above the graduations in plainly legible characters, a mark, defining the weight of the charge to be used (nine grams).

The total height of the bottle shall be between 150 and 165 millimeters ( $5\frac{7}{8}$  and  $6\frac{1}{2}$  inches), same as standard milk test bottles.

**Fifty per cent, nine gram, long-neck bottle.**—The same specifications in every detail as specified for the 50 per cent nine gram, short-neck bottle shall apply for the long-neck bottle, with the exception, however, that the total height of this bottle shall be between 210 and 234 millimeters ( $8\frac{1}{4}$  and  $8\frac{3}{8}$  inches) and that the total length of the graduation shall be not less than 120 millimeters.

**The fifty per cent, 18 gram, long-neck bottle.**—The same specifications in every detail as specified for the 50 per cent nine gram, long-neck bottle shall apply, with the exception that the charge of the bottle shall be 18 grams, and the mark defining the weight of the charge placed at the top of the neck shall be 18.

The total length of the Standard Babcock pipette shall be not more than 330 millimeters, ( $13\frac{1}{4}$  inches). Outside diameter of suction tube six to eight millimeters. Length of suction tube 130 millimeters. Outside diameter of delivery tube 4.5 to 5.5 millimeters. The length of delivery tube 100 to 120 millimeters. Distance of graduation mark above bulb 30 to 60 millimeters. Nozzle straight. Delivery 17.6 c. c. of water at 20 degrees Centigrade in five to eight seconds.

#### Scale for Weighing Cream

**Section 13.** The sensibility of all scales used for weighing cream samples into the test bottles shall be not more than 30 milligrams and the standard weights shall be 9 grams and 18 grams.

#### Speed of the Babcock Tester.

**Section 14.**—In all testing of milk or cream where the same is received or purchased upon the basis of the amount of butter fat contained therein, the Babcock tester shall be operated at the proper speed which is as follows:

For tester with diameter of 14 inches the speed shall be between 875 and 925 revolutions per minute.

For tester with diameter of 16 inches, the speed shall be between 825 and 875 revolutions per minute.

For tester with diameter of 18 inches the speed shall be between 775 and 825 revolutions per minute.

For tester with diameter of 20 inches, the speed shall be between 725 and 775 revolutions per minute.

For a tester with a diameter of 24 inches, the speed shall be between 575 and 625 (675 and 725) revolutions per minute.

### Court Jurisdiction

Section 15. Justice Courts, District Courts, and Municipal Courts sitting as Justice Courts, shall have concurrent jurisdiction with the Circuit Courts of all prosecutions arising under this Act.

The District or County Attorney is authorized to institute prosecutions for violation of this Act by information or the same may be instituted by indictment or by complaint verified before any magistrate.

**General Information.** The provision of this law will be made effective May 22, 1915. After that date it will be unlawful for a manufacturer of dairy products to continue in business or for a person to operate the Babcock test where milk or cream is purchased on the butter fat basis, without a license.

It is also unlawful to continue to use other than standard glassware that has been examined for accuracy and marked with the letters S. G. O. (Standard Glassware Oregon).

**Examination of Standard Babcock Testing Glassware.** Send all testing glassware properly packed to Dairy Department, Oregon Agricultural College, Corvallis, Oregon.

Glassware may be sent by parcel post, express or freight. All transportation charges must be prepaid by the sender.

All shipments of glassware must be accompanied by check, draft, or money order covering charges of examination of such glassware on the basis of three (3) cents for each piece of glassware.

Shipments of glassware arriving collect or without remittance for examination, will be held until payment for transportation and examination fees is made. Postage stamps will not be accepted as payment for such charges.

Testing glassware sent direct from the manufacturer or dealer will be subject to the same rule.

When ordering Babcock testing glassware from the manufacturer or dealer, specify that standard glassware in accordance with the requirements of the Oregon law, is wanted. Glassware not conforming to the specifications of standard glassware will be rejected and returned at the owners expense.

When shipping glassware for examination, state clearly how it should be returned, whether by express or freight. In the absence of instructions it will be returned by express.

After examination of the glassware every piece found correct will be marked with the letters S. G. O. (Standard Glassware Oregon) and promptly returned to the owner. A detailed report of the total pieces of glassware received and found correct will be mailed to the owner.

**License for Manufacturers.** In accordance with the provisions of the law, licenses will be issued by the Dairy and Food Commissioner, upon payment of the fee.

**License for Testers.** Testers licenses will be issued to every person

complying with Sections 5, 6, and 8 of the law, and the rules of the Board of Examiners.

The candidate must take and successfully pass the tester's license examination at the Oregon Agricultural College, Corvallis, Oregon, or at other places designated by the board. The announcements of the date of the examinations will be issued in special circulars, or in the dairy and state press, or both.

The candidate for the tester's license who has successfully passed the examination will receive a certificate of proficiency. Upon presentation of the certificate and the payment of \$1.00, the Dairy and Food Commissioner will issue such license.

Tester's licenses are good for one year and may be renewed annually without examination provided the applicant has conformed to the provisions of the law and upon the payment of \$1.00.

The tester's license must be posted in plain sight in the testing room where the tester is employed. The license will be revoked if the licensee has failed to comply with the law.

**Examination of Applicants for Tester's License.** The examination will consist of a laboratory exercise and a written test. The laboratory exercise will include the testing of various samples of milk and cream. In the written test the applicant will be required to answer a series of questions on the composition, sampling and testing of milk and cream.

The following questions and answers may serve as a guide to the prospective candidate for a tester's license as showing the scope of the subject which he should know and on which he may be examined. It is to put before him the information he needs in a brief, clear and definite form. It should not be understood from the above that the examination will include these questions word for word, nor that it will be confined to these questions only, nor that it will cover all these questions. The questions merely serve as a guide for the benefit of applicants for testers licenses.

### Milk Testing

Question 1.—What is a standard milk test bottle?

Answer.—A standard milk test bottle is a test bottle graduated to 8 per cent with subdivisions of one-tenth per cent.



Fig 1.—Standard Milk Bottle and Pipette.

Question 2.—How can you tell if a test bottle is accurate and conforms to the requirements of the law?

Answer.—It is illegal to use a bottle that has not been examined for accuracy and if so examined it is indelibly marked with the letters S. G. O. (Standard Glassware Oregon).

Question 3.—What is the average composition of normal milk?

Answer.—Water .....	87.0 per cent.
Fat .....	4.0 per cent.
Casein .....	3.0 per cent.
Milk Sugar .....	4.8 per cent.
Albumin .....	.5 per cent.
Ash .....	.7 per cent.
	100.0 per cent.

Question 4.—What variations in fat content occur in normal milk?

Answer.—Normal milk, ordinarily, contains from 3 per cent to 6 per cent of fat, although cases are not rare where a lower or higher fat content is found.

Question 5.—How should a sample of milk for testing be secured?

Answer.—The milk should be thoroughly mixed by pouring from one can or bucket to another two or three times and the sample taken at once.

Question 6.—How should the milk sample be preserved?

Answer.—Test if possible within twelve hours of the time the milk was drawn from the cow. If necessary, to preserve or keep longer, use a clean bottle with a tight seal such as bottles with patent tin caps, or screw tops, or cork or glass stoppers. Add corrosive sublimate or other preservative. Dissolve by shaking. Seal tightly and place where it is cool. If additional samples are taken into the same jar, mix after each addition by giving the bottle a rotary motion.

Question 7.—How should the milk sample be prepared for the test?

Answer.—The cream must be uniformly mixed with the milk. This is best accomplished by shaking or by pouring from one jar to another several times.

Question 8.—If the sample contains lumps of dried cream or butter how should it be treated before testing?

Answer.—Melt the fat by setting the jar into warm water. When dissolved, mix thoroughly and measure into test bottle at once.

Question 9.—If the milk sample is sour and contains lumps of curd how should it be treated?

Answer.—Add a knife point full of soda lye; shake, and let stand until the curd is thoroughly dissolved. When this is done the sulphuric acid should be added a little at a time as the chemical action is violent.

Question 10.—How much milk and how much acid should be used?

Answer.—17.6 cubic centimeters of milk.

17.5 cubic centimeters of acid.

Question 11.—How is the milk measured and delivered into the test bottle?

Answer.—With a pipette.

Question 12.—How are the water and acid mixed?

Answer.—With a rotary motion until the curd is completely dissolved.

Question 13.—What kind and strength of acid should be used?

Answer.—Commercial sulphuric acid, specific gravity 1.82 to 1.83.

Question 14.—What should be done if the acid is too weak?

Answer.—If slightly too weak use a trifle more acid, if much too weak, get a new supply.

Question 15.—What should be done if the acid is too strong?

Answer.—If slightly too strong use a trifle less acid. If much too strong dilute with a small amount of water. Pour the acid into the water. To pour the water into the acid is dangerous.

Question 16.—At what temperature should the milk and acid be before mixing?

Answer.—55 to 70 degrees F.

Question 17.—How many minutes should the bottles be whirled in the tester?

Answer.—Three times. First, whirling 5 minutes, fill with hot water to the bottom of neck of bottle. Second, whirling two minutes, fill with hot water until the fat column is contained within the graduated portion of the neck. Third, whirling one minute. This also applies to cream testing.

Question 18.—What is the correct speed of the tester?

Answer.—From 675 to 925 revolutions a minute, depending upon diameter of the tester. (See Section 14 of the law.)

Question 19.—At what temperature should the test be read?

Answer.—At 130 to 140 degrees F.

Question 20.—How should the temperature of the fat in the bottles be regulated?

Answer.—Set the bottles in a water bath at 130 to 140 degrees F. for five minutes. The water must reach to the top of the fat column.

Question 21.—What is the meniscus?

Answer.—The curve at the bottom and top of the fat column.

Question 22.—How should the test be read. Draw a diagram.

Answer.—The meniscus at both top and bottom should be included in the reading.

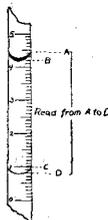


Fig. 2.—Milk Test should be read as shown here.

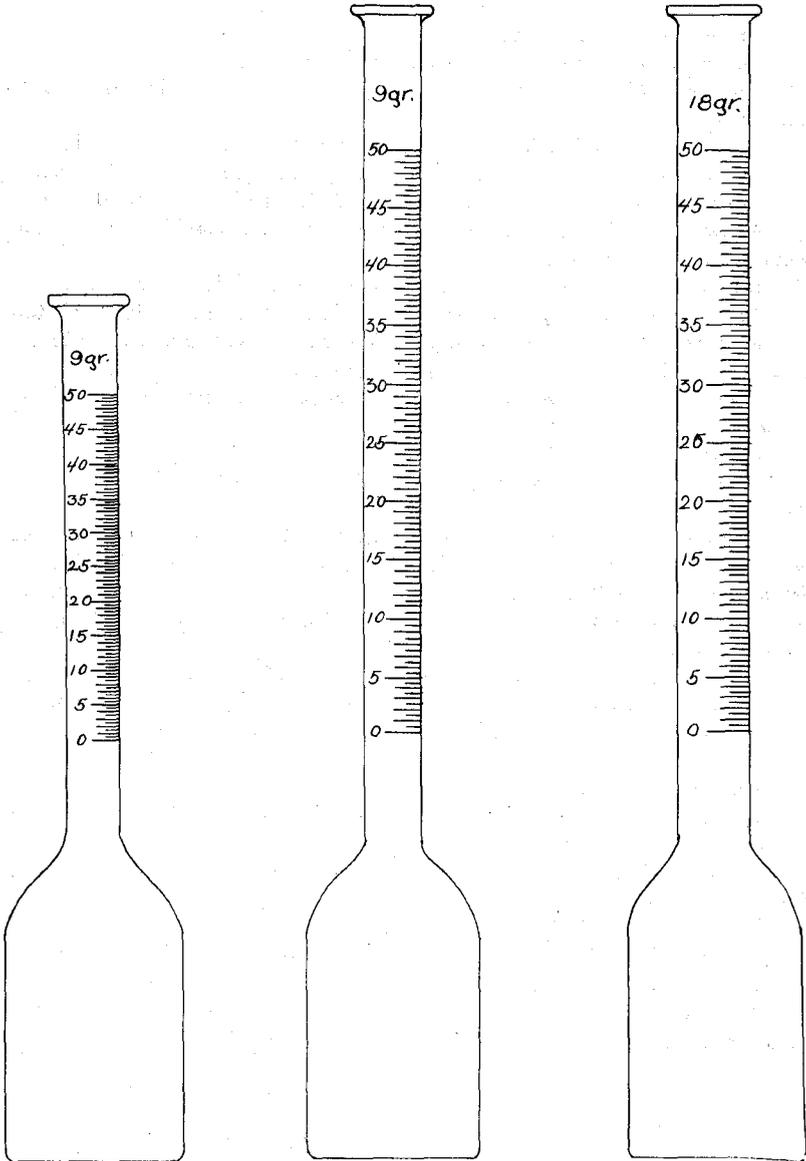


Fig 3.—Standard Cream Test Bottles.

### Cream Testing

Question 23.—What is a standard cream test bottle?

Answer.—Three types of bottles are accepted as standard cream test bottles, a 50 per cent nine gram, short-neck bottle; a 50 per cent 9 gram, long-neck bottle; and a 50 per cent 18 gram long-neck bottle. The bottles must have been examined for accuracy and bear the letters S. G. O. (Standard Glassware Oregon).

Question 24.—How should the cream sample be taken?

Answer.—The cream should be mixed by pouring or stirring until it is uniform throughout and all lumps have disappeared. At least one ounce should be taken as a sample in order to provide for a retest in case of necessity.

Question 25.—How soon after taking should cream samples be tested?

Answer.—As soon as possible. If the testing cannot be done at once the samples must be kept in a tightly corked bottle to prevent evaporation.

Question 26.—How should the cream sample be prepared for testing?

Answer.—The sample must be thoroughly mixed so as to be uniform throughout. If lumps are present or particles of butter, heat to 110 degrees F. until dissolved, mix and weigh into test bottles at once.

Question 27.—Why should the cream be weighed into the test bottle instead of measured?

Answer.—Because measuring does not give an accurate test. The weight of cream varies with its fat content and other conditions and it is difficult to transfer all the cream in the pipette into the cream bottle.

Question 28.—What is the correct weight for testing cream?

Answer.—9 grams or 18 grams, depending upon the type of bottle used.

Question 29.—What precautions should be observed in weighing cream?

Answer.—Use a sensitive balance, setting level, in good working order and protected against drafts while weighing. If any cream is spilled on the balance, remove it before the weighing is completed.

Question 30.—How much sulphuric acid should be used?

Answer.—The amount varies with the condition of the cream. Use enough so that the mixture of acid and cream, just after shaking, is of a coffee-brown color.

Question 31.—At what temperature should the cream tests be read?

Answer.—At 130 to 140 degrees F.

Question 32.—How is the temperature best regulated?

Answer.—By setting the cream test bottles into a water bath at 130 to 140 degrees F. for ten minutes. The water should reach to the top of the fat column.

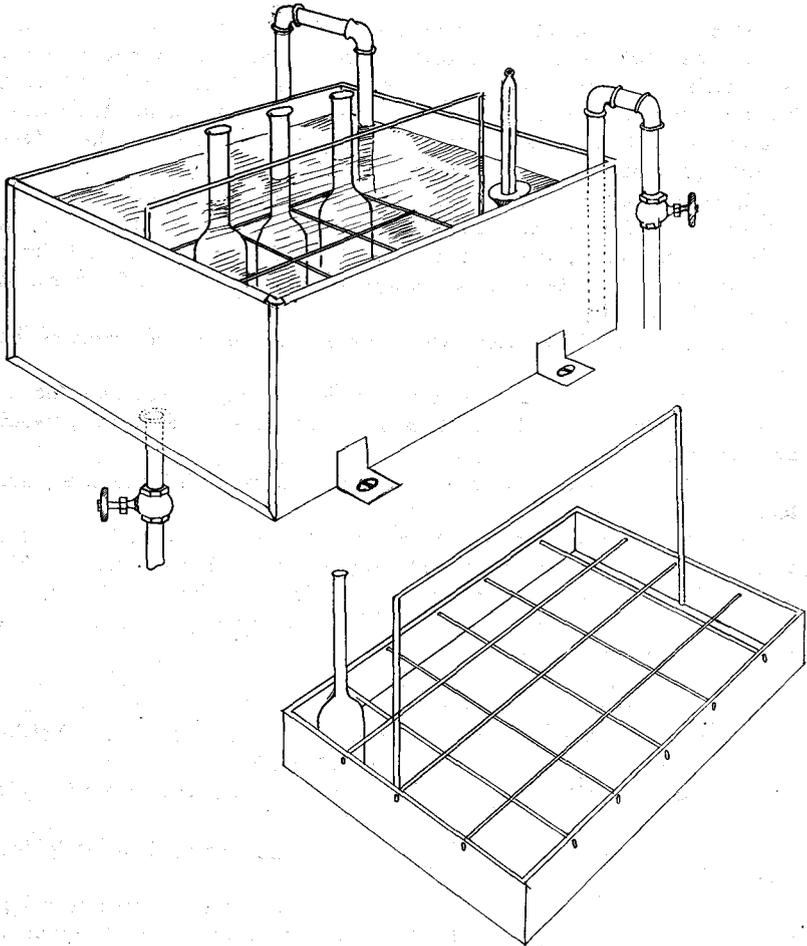


Fig. 4.—Water Bath. Its use is recommended to secure and maintain correct reading temperature.

Question 33.—How should the fat column be read?

Answer.—The bottle should be held on a level with the eye and the reading should include one-third of the meniscus.

Question 34.—What aid is recommended in reading the fat column in cream testing?

Answer.—The use of glymol or of fat-saturated alcohol. Glymol is a white mineral oil. It is inexpensive and can be secured from any druggist. Fat-saturated alcohol is made by adding butter fat to alcohol until it will take up no more.

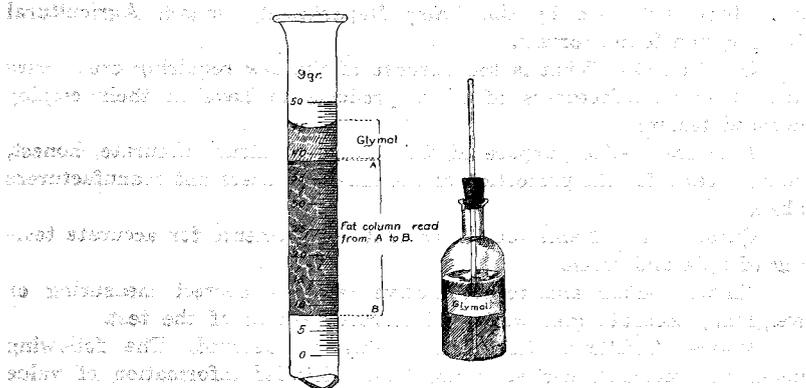


Fig. 5 — Reading the Fat Column with the Aid of Glymol. Bottle of Glymol with tubes for transferring glymol to test bottle.

Question 35.—How are these materials used?

Answer.—At the conclusion of the test and just before reading, a small amount of either the glymol or saturated alcohol is run down the side of the neck onto the top of the fat. This removes the meniscus and gives a straight line to the top of the fat column. Quicker, easier, and more accurate reading is thus made possible. A pipette, burette, or glass tube should be used for adding these materials. Coloring matter may be added to the glymol or saturated alcohol, which will make the dividing line more distinct.

Question 36.—Should glymol or saturated alcohol be used in the milk test?

Answer.—No. It is necessary to include the meniscus in order to compensate for the loss of residual fat in the bulb of the bottle. If these materials were used the reading of the milk test would be too low.

Question 37.—What causes air bubbles on the top of the fat column?

Answer.—Air bubbles are due to the use of hard water. If the water is hard, soften by boiling or by adding to it a few drops of sulphuric acid. Better still, use rain water or distilled water.

Question 38.—What causes a milky and curdy fat column?

Answer.—Too little or too weak acid.

Question 39.—What causes a dark and charred fat column?

Answer.—Too much or too strong acid.

Question 40.—How is skimmed milk and buttermilk tested for fat content?

Answer.—A special skim milk bottle should be used. The test is the same as for whole milk using the same amounts of milk and acid.

Question 41.—What do the letters S. G. O. mean which are etched on the test bottles?

Answer.—The letters S. G. O. stand for the words, "Standard Glassware Oregon." They mean that the bottles bearing these letters

have been examined by the Dairy Department, Oregon Agricultural College, and found correct.

Question 42.—What is the purpose of the law requiring creameries and other manufacturers of dairy products to have in their employ licensed testers?

Answer.—The purpose of this law is to insure accurate, honest, reliable tests for the protection of the milk producers and manufacturers alike.

Question 43.—Name four important requirements for accurate testing of milk and cream.

Answer.—Fair and representative samples, correct measuring or weighing, accurate glassware and correct reading of the test.

**Where Additional Information May be Secured.** The following books are recommended as giving much detailed information of value to dairymen and creamerymen.

“Modern Methods of Testing Milk and Milk Products” by Lucius L. Van Slyke. Orange Judd & Company, New York City, publishers.

“Testing Milk and Milk Products,” by Farrington and Woll. Mendota Publishing Co., Madison, Wis., publishers.

These books may be ordered through any book store or may be secured direct from the publishers.

Consult the Dairy Department, Agricultural College, regarding any point not made plain in the bulletin or on other matters relating to the dairy industry.

**A Word to Manufacturers of and Dealers in Babcock Testing Glassware.** All Babcock testing glassware sold to person and firms located in the State of Oregon must conform to the specifications for standard glassware as stated in the law, a copy of which is included in this bulletin. Babcock testing glassware not conforming to these specifications will be returned at the vendor's expense.

Glassware sent to the Agricultural College to be tested and forwarded to the purchaser must be accompanied by a tag bearing the name and full address of the purchaser. Such glassware must be shipped prepaid. Shipments arriving collect will be held until remittance arrives for transportation and to cover fees for examination.

Ship all glassware to Dairy Department, Oregon Agricultural College, Corvallis, Oregon.